

Complete Summary

GUIDELINE TITLE

Guidelines for emergency tracheal intubation immediately following traumatic injury.

BIBLIOGRAPHIC SOURCE(S)

Eastern Association for the Surgery of Trauma (EAST). Guidelines for emergency tracheal intubation immediately following traumatic injury. Allentown (PA): Eastern Association for the Surgery of Trauma (EAST); 2002. 80 p. [261 references]

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

Acute trauma and potential/actual respiratory system insufficiency

GUIDELINE CATEGORY

Evaluation
 Management
 Treatment

CLINICAL SPECIALTY

Emergency Medicine

INTENDED USERS

Advanced Practice Nurses
 Allied Health Personnel

Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To present evidence-based guidelines to characterize patients in need of emergency tracheal intubation immediately following traumatic injury and to delineate the most appropriate access procedure

TARGET POPULATION

Acute trauma patients (i.e., patients with sustained blunt trauma, penetrating trauma, or heat-related injury) with potential/actual respiratory system insufficiency in a prehospital, emergency department, or trauma center setting

INTERVENTIONS AND PRACTICES CONSIDERED

Emergency tracheal interventions

1. Orotracheal intubation (OTI)
2. Drug-assisted orotracheal intubation
3. Nasotracheal intubation (NTI)
4. Fiberoptic-assisted tracheal intubation
5. Cricothyrostomy
6. Emergency tracheostomy
7. Esophageal-tracheal Combitube insertion
8. Laryngeal mask airway insertion

MAJOR OUTCOMES CONSIDERED

- Rates of emergency tracheal intubation among various types/groups of acute trauma patients
- Rates of success and complications in various types of intubation
- Factors impacting intubation success rates (e.g., drug-assisted orotracheal intubation [OTI], types of emergency personnel)
- Rates of patients intubated prehospital

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Medline searches were performed to identify potentially relevant articles:

Acute trauma-related respiratory system insufficiency:

English language / human / 1970-2001 / all ages / all study types. Exact terms and strategies are listed in the original guideline document.

Acute trauma and emergency tracheal intubation:

English language / human / 1980-2001 / all ages / all study types. Exact terms and strategies are listed in the original guideline document.

In addition to MEDLINE searches:

- patient investigation articles that addressed the guideline objectives were selected for comprehensive review.
- the bibliography of reviews, letters to the editor, and meta-analyses were used to identify additional patient investigation articles.
- committee members included 10 trauma surgeons with expertise in critical care, 1 emergency medical physician, and 1 neurosurgeon.
- if an article investigated trauma and medical patients, the article was excluded if the trauma patient cohort was less than 50% of the total group.
- the committee was given the complete bibliography and asked to recommend additional, appropriate articles, if any.

NUMBER OF SOURCE DOCUMENTS

- Evidence that trauma patients with airway obstruction need emergency intubation: 21 studies
- Evidence that trauma patients with hypoventilation need emergency intubation: 16 studies
- Evidence that trauma patients with severe hypoxemia need emergency intubation: 8 studies
- Evidence that trauma patients with Respiratory distress need emergency intubation: 16 studies
- Evidence that patients with severe cognitive impairment (GCS ≤ 8) need emergency intubation: 31 studies
- Evidence that trauma patients with cardiac arrest need emergency intubation: 10 studies
- Evidence that trauma patients with severe hemorrhagic shock need emergency tracheal intubation: 10 studies
- Evidence that select patients with smoke inhalation need emergency tracheal intubation: not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Class I evidence: Randomized controlled trial (RCT)

Class II evidence: Prospective clinical trial or retrospective analysis based on reliable data

Class III evidence: Retrospective case series or database review

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Literature review assignments:

Committee members were assigned articles that described emergency tracheal intubation in acutely injured trauma patients. The committee chair reviewed all the tracheal intubation articles and summarized all articles that described trauma patient conditions at-risk for respiratory system insufficiency.

Documentation of literature results:

A manuscript data form was constructed to standardize the information collected from each tracheal intubation article. A description of manuscript data form elements can be found in the original guideline document.

Committee members and the chair reviewed all tracheal intubation articles and completed a data form for each article. Any discrepancy between information on the chair's data form and the committee member's data form was reconciled by further review of the article. Information from the data form was entered into a computerized database. Data was harvested from the computerized database to address clinically meaningful queries. Data were displayed in tables and organized to (a) characterize trauma patients in need of emergency tracheal intubation immediately following traumatic injury and (b) delineate the most appropriate access procedure for trauma patients undergoing emergency tracheal intubation. All tables were disseminated to each committee members for review and comments. Based on the literature-evidence, recommendations were made.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Level 1 recommendation: This recommendation is convincingly justifiable based on the available scientific information alone. It is usually based on Class I data, however, strong Class II evidence may form the basis for a level 1 recommendation, especially if the issue does not lend itself to testing in a

randomized format. Conversely, low quality or contradictory Class I data may not be able to support a level 1 recommendation.

Level 2 recommendation: This recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. It is usually supported by Class II data or a preponderance of Class III evidence.

Level 3 recommendation: This recommendation is supported by available data but adequate scientific evidence is lacking. It is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

A final document was drafted by the panel presenting a synthesis of the literature review and the opinion of the panel members. The draft document was then submitted to all members of the panel for review and modification. Subsequent to this the guidelines were forwarded to the chairman of the Eastern Association for the Surgery of Trauma (EAST) ad hoc committee for guideline development. Final modifications were made and the document forwarded back to the individual panel chairpersons.

The guidelines were then presented to EAST membership. This may have been accomplished by oral presentation at the national meeting or via the Internet. This allowed the members an opportunity to ask questions, make suggestions, and improve the guidelines.

Approximately 3 months after presentation, final revisions were made and the guidelines were submitted to the Guideline Editorial Review Board. The board is made up of members of the American Association for the Surgery of Trauma (AAST). The purpose of the review was to assure that the recommendations are supported by the evidence, that all the evidence pertinent to the guideline was collected, and to offer expert opinion in areas where there is debate or lack of adequate data. The revised document was then sent back to panel chairpersons and the chairman of the guideline committee.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of recommendation (I-3) and classes of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Recommendations to Characterize Patients in Need of Emergency Tracheal Intubation Immediately Following Traumatic Injury

Level I

Level I recommendations are typically predicated on evidence from randomized, controlled trials. The relevant literature is devoid of randomized, controlled trials and has been comprehensively reviewed to find the best available evidence. The recommendations are based on several peer-review journal publications from institutions throughout the United States and are typically supported in multiple professional organization and society publications. The committee did not find alternative management strategies that were as effective as the recommendations. In summary, the committee consensus finds the recommendations to reflect management principles with a high degree of certainty.

1. Emergency tracheal intubation is needed in trauma patients with the following traits:
 - a. airway obstruction
 - b. hypoventilation
 - c. severe hypoxemia (hypoxemia despite supplemental oxygen)
 - d. severe cognitive impairment (Glasgow Coma Score [GCS] ≤ 8)
 - e. cardiac arrest
 - f. severe hemorrhagic shock
2. Emergency tracheal intubation is needed in smoke inhalation patients with the following conditions:
 - a. airway obstruction
 - b. severe cognitive impairment (GCS ≤ 8)
 - c. major cutaneous burn ($\geq 40\%$)
 - d. prolonged transport time
 - e. impending airway obstruction:
 - i. moderate-to-severe facial burn
 - ii. moderate-to-severe oropharyngeal burn
 - iii. moderate-to-severe airway injury seen on endoscopy

Recommendations for Procedural Options in Trauma Patients Undergoing Emergency Tracheal Intubation

Level I

1. Orotracheal intubation guided by direct laryngoscopy is the emergency tracheal intubation procedure of choice for trauma patients.
2. When the patient's jaws are not flaccid and orotracheal intubation (OTI) is needed, a drug regimen should be given to achieve the following clinical objectives:
 - a. neuromuscular paralysis
 - b. sedation, as needed
 - c. maintain hemodynamic stability
 - d. prevent intracranial hypertension

- e. prevent vomiting
- f. prevent intra-ocular content extrusion
- 3. Enhancements for safe and effective emergency tracheal intubation in trauma patients include:
 - a. availability of experienced personnel
 - b. pulse oximetry monitoring
 - c. maintenance of cervical spine neutrality
 - d. application of cricoid pressure
 - e. carbon dioxide monitoring
- 4. Cricothyrostomy is appropriate when emergency tracheal intubation is needed and the vocal cords cannot be visualized during laryngoscopy or the pharynx is obscured by copious amounts of blood or vomitus.

Level III

- 1. The laryngeal mask airway and Combitube are alternatives to cricothyrostomy and may be selected when cricothyrostomy expertise is limited.

Definitions:

The correlation between the evidence and the recommendations is as follows:

Level 1 recommendation: This recommendation is convincingly justifiable based on the available scientific information alone. It is usually based on Class I data, however, strong Class II evidence may form the basis for a level 1 recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low quality or contradictory Class I data may not be able to support a level 1 recommendation.

Level 2 recommendation: This recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. It is usually supported by Class II data or a preponderance of Class III evidence.

Level 3 recommendation: This recommendation is supported by available data but adequate scientific evidence is lacking. It is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

Class I evidence: Randomized controlled trials (RCTs)

Class II evidence: Prospective clinical trial or retrospective analysis based on reliable data

Class III evidence: Retrospective case series or database review

CLINICAL ALGORITHM(S)

An algorithm is provided for procedural options for trauma patients in need of emergency tracheal intubation.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Conclusions were based on evidence obtained from prospective, non-comparative studies and retrospective series with controls (Class II) or retrospective analyses (case series, databases or registries, case reviews, expert opinion) (Class III). The majority of the studies cited as evidence were Class III. There were no Class I studies (i.e., prospective randomized trials) cited as evidence.

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Assist clinicians in selecting appropriate types of patients and access procedures for tracheal intubation immediately following traumatic injury
- Improve success rates for emergency intubation
- Reduce emergency intubation complication rates

POTENTIAL HARMS

Complications from Emergency Tracheal Intubation

The literature review accompanying the guidelines determined that overall emergency intubation complication rates were as follows: orotracheal intubation (OTI) without drug assistance 19.0% (95% confidence interval [CI], 13.7-24.3%), OTI with drug-assistance 3.6% (95% CI, 3.0-4.2%), nasotracheal intubation 4.4% (95% CI, 2.7-6.1%), and cricothyrostomy 9.6% (95% CI, 7.1-12.1%).

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Guidelines are an expected part of medical practice in today's society. However, they cannot be blindly accepted nor considered inviolate. If that were the case they would cease to be guidelines and would become standards or even mandates. Guidelines must be directed primarily toward the well being of the patient.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The final version of the guideline is forwarded to the Journal of Trauma and to the Eastern Association for the Surgery of Trauma Web page.

The guideline developers make the following recommendations regarding implementation:

Implementation involves extensive education and inservicing of nursing, resident, and attending staff members and has one important guiding principle: the guidelines must be available to the clinicians in real time while they are actually seeing the patient. The two most common ways to apply these are by using either a critical pathway or a clinical management protocol. A critical pathway is a calendar of expected events that has been found to be very useful within designated diagnosis-related groups. In trauma, where there are multiple diagnosis-related groups used for one patient, pathways have not been found to be easily applied with the exception of isolated injuries. Clinical management protocols, on the other hand, are annotated algorithms that answer the "if, then" decision making problems and have been found to be easily applied to problem-, process-, or disease-related topics. The clinical management protocol consists of an introduction, an annotated algorithm and a reference page. The algorithm is a series of "if, then" decision making processes. There is a defined entry point followed by a clinical judgment and/or assessment, followed by actions, which are then followed by outcomes and/or endpoints. The advantages of algorithms are that they convey the scope of the guideline, while at the same time organize the decision making process in a user-friendly fashion. The algorithms themselves are systems of classification and identification that should summarize the recommendations contained within a guideline. It is felt that in the trauma and critical care setting, clinical management protocols may be more easily applied than critical pathways, however either is acceptable providing that the formulated guidelines are followed. After appropriate inservicing, a pretest of the planned guideline should be performed on a limited patient population in the clinical setting. This will serve to identify potential pitfalls. The pretest should include written documentation of experiences with the protocol, observation, and suggestions. Additionally, the guidelines will be forwarded to the chairpersons of the multi-institutional trials committees of Eastern Association for the Surgery of Trauma (EAST), Western Association for the Surgery of Trauma (WAST) and American Association for the Surgery of Trauma (AAST). Appropriate guidelines can then be potentially selected for multi-institutional study. This process will facilitate the development of user friendly pathways or protocols as well as evaluation of the particular guidelines in an outcome based fashion.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Eastern Association for the Surgery of Trauma (EAST). Guidelines for emergency tracheal intubation immediately following traumatic injury. Allentown (PA): Eastern Association for the Surgery of Trauma (EAST); 2002. 80 p. [261 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2002

GUIDELINE DEVELOPER(S)

Eastern Association for the Surgery of Trauma - Professional Association

SOURCE(S) OF FUNDING

Eastern Association for the Surgery of Trauma (EAST)

GUIDELINE COMMITTEE

EAST Practice Management Guidelines Workgroup

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Work Group Members: C. Michael Dunham, MD; Robert D. Barraco, MD; David E. Clark, MD; Brian J. Daley, MD; Frank E. Davis, III, MD; Michael A. Gibbs, MD; Thomas Knuth, MD; Peter B. Letarte, MD; Fred A. Luchette, MD; Laurel Omert, MD; Leonard J. Weireter, MD; Charles E. Wiles, III, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#).

Print copies: Available from Eastern Association for the Surgery of Trauma Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Utilizing evidence based outcome measures to develop practice management guidelines: a primer. Allentown (PA): Eastern Association for the Surgery of Trauma; 2000. 18 p. Available from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#).

An excerpt is also available:

- Pasquale M, Fabian TC. Practice management guidelines for trauma from the Eastern Association for the Surgery of Trauma. J Trauma 1998 Jun;44(6):941-56; discussion 956-7.

Print copies: Available from EAST Guidelines, c/o Fred Luchette, MD, Loyola University Medical Center, Department of Surgery Bldg. 110-3276, 2160 S. First Avenue, Maywood, IL 60153; Phone: (708) 327-2680; E-mail: fluchet@lumc.edu.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on October 10, 2002. The information was verified by the guideline developer on November 18, 2002.

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